# Purdue QuarkNet Summer Workshop

## July 23-27, 2012

Purdue University hosted nine teachers from Central Indiana this summer, about half of which had never before participated in QuarkNet. The increased interest is largely attributed to the efforts of David Sederberg, the new outreach coordinator for the Department of Physics. David actively solicited applications with the aim of reinvigorating the Purdue QuarkNet effort, which had dwindled after the loss of Julie Conlon, our previous outreach coordinator, and several key teachers in the group. David Sederberg's background is in the field of physics education research and he is interested in exploring several interesting opportunities to learn how students develop models of physical processes, like cosmic ray air showers, for which they have no direct sensory information. In addition, a Purdue undergraduate physics student participated in the workshop activities and continues to provide support for teachers working with the cosmic ray detectors in their classrooms through a service learning course in the fall 2012 semester.

The format of the workshop was similar to previous years, but accommodated the new teachers by providing introductory material and activities on particle physics, cosmic rays and activities using the cosmic ray detector. A significant element of the presentations and activities was the showcasing of a software interface developed by Frank Roetker, a Jefferson High School student, and Prof. Jones as an outreach component of an NSF award. This software provides a simple interface with which to perform many experiments with the cosmic ray detector hardware, including plateauing counters, measuring cosmic ray flux over long time periods, measuring the muon lifetime, the speed of muons, and searching for extensive air showers. Recently, this software has been used by a student from McCutcheon High School to measure the flux of cosmic rays at altitudes up to 9000 ft in an airplane as preparation for a possible balloon flight.

In addition to particle physics presentations and hands-on experiments with the cosmic ray detector, talks were given by Dr. Glenn Sembroski on the Pierre Auger cosmic ray observatory, by Prof. Marc Caffee on the use of cosmic rays as a production source of radionuclides used in dating sedimentary rocks, and by Prof. Jones on the physics of the recent observation of the Higgs boson at the Large Hadron Collider. The teachers also toured Fermilab, including the CDF collision hall, and the tandem Van de Graaff accelerator in the PRIME lab at Purdue. Materials prepared for the summer workshop, including the software interface for the cosmic ray detector, are available on the public web page http://www.physics.purdue.edu/~mjones/quarknet.

*Purdue QuarkNet participants during a tour of the tandem Van de Graaff accelerator facility at the Purdue Rare Isotope Measurement (PRIME) lab.*